

annual exports having amounted to 382,000 cwt. The petroleum industry increased at a greater rate even than coal mining, the production having risen from 19,000,000 gallons in 1897 to 88,000,000 gallons in 1903. Rubies form, next to petroleum, the chief source of revenue from minerals in Burma, the value of the output having risen from 57,950*l.* to 98,575*l.* In the case of mica, India is the leading producer, and supplies half the world's consumption. The value of the mica produced in 1898 was 53,890*l.*, and in 1903 86,277*l.* The waste heaps are now turned over to supply the cheaper varieties required for the manufacture of micanite for electric insulation. The rapid development of the manganese ore industry has been very remarkable. Twelve years ago mining had hardly begun, and now more high-grade ore is produced than in any other country except Russia. The value of the output in 1898 was 27,426*l.*, whilst in 1903 it was 132,741*l.* Jadestone, which is being exported in increasing quantities to the Straits and China, with an average annual value of 44,770*l.* for the mineral exported, must be classed among the important minerals, its value being seven times that of the tin and half that of the rubies. Iron ore is mined to supply the Barakar works and the old charcoal furnaces still persisting in the more remote districts. In view of the fact that the imports of iron and steel are increasing year by year, there appear to be good grounds for utilising the abundant ore supplies by starting iron works on a large scale. During the period under review the graphite deposits of Travancore and the magnesite deposits of Salem received attention, and now form serious items in the comparatively limited markets of these minerals. Tin is more widely distributed in India than is generally recognised, and in South Burma river gravels are washed for tin with considerable commercial success.

The minerals for which statistics of production are incomplete are of a very varied nature, the list including alum and aluminium ore, amber, antimony, arsenic, asbestos, borax, building stones, chromite, clays, copper ore, corundum and other abrasives, gem stones, glass-making sands, lead, silver and zinc ores, millstones, mineral paints, mineral waters, phosphates, rare earths, slate, sodium compounds, steatite, and sulphur. It is evident that there is great scope for development in the mining of metalliferous minerals and of minerals that are needed for the more complicated chemical and metallurgical industries. This is not surprising in view of the fact that by-products are indispensable sources of profit in modern chemical and metallurgical practice; and India must continue to pay taxes on imports until industries arise demanding a sufficient number of chemical products to complete an economic cycle. Until that time, ores that will not pay to work for their metal contents alone must necessarily be neglected.

DISEASES OF FOREST TREES.

THE Board of Agriculture and Fisheries has recently issued a set of nine diagrams illustrating the diseases of forest trees. The set is composed of forty-five coloured figures. Very scant attention has been paid to this important branch of forestry in the past, and it is only within comparatively recent times that such works as those of Hartig and Sommerville, Tubeuf and Smith, Marshall Ward, Massee and others have directed attention to the importance of the study of tree diseases from a practical point of view. By such means the public has come to realise that plants, like animals, are subject to various ailments which, if not attended to, may become epidemic and cause serious loss, not only in forestry, but also in the sister industries of agriculture and horticulture. As an instance of the serious loss which may be caused by fungus disease in trees, we need only mention the larch canker fungus, which has in many cases reduced one of the most stately trees of Europe to an unsightly cripple, and is thereby responsible for the loss of many hundreds of thousands of pounds in this country alone. Its ubiquity in this country is no doubt in a large measure due to the lack of proper care in the selection of localities and proper treatment of this timber tree. This is only one of the many examples of the havoc which may be wrought by epidemics among forest trees, and in addition to this the

fruit-grower, the farmer, and the gardener could also furnish parallel examples to swell the list. As we have already stated, the importance of these matters is becoming greater as scientific investigation proceeds. It is of vital importance in practice that a plant disease of any kind should be recognised in its earliest stages, as it is then in most cases capable of being stamped out. It is too late to adopt preventive measures when the presence of the disease is made known by the destruction of the crop.

The importance of the whole subject to the public in general is shown by the fact that the Board of Agriculture has issued the above valuable series of diagrams, each illustration being accompanied by a printed description on a separate sheet.

The set contains the best series we have of the diseases of forest trees, and should find a place not only in all our universities and colleges, but in every school throughout the country. It is absolutely indispensable to all foresters and to those interested in the growth and production of timber.

The price, which is one shilling per diagram, should bring the set within the reach of all.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The council of the Senate has had under its consideration an offer received from the Surveyors' Institution to provide scholarships in the university, with the object of affording facilities for the higher education of surveyors in branches of scientific knowledge cognate to their profession. The council, after consultation with the Board of Agricultural Studies, is of opinion that the offer should be gratefully accepted. The scholarships will be called "The Surveyors' Institution Scholarships"; they will be three in number, one to be awarded annually. Each scholarship will be tenable for three years, and will be of the value of 80*l.* per annum.

The general board of studies has approved the name of Mr. A. N. Whitehead for the degree of Doctor in Science.

In the mathematical tripos, part i., the senior wranglers (bracketed equal) are Mr. J. E. Littlewood and Mr. J. Mercer, both of Trinity.

OXFORD.—The following have been appointed examiners in the science schools:—P. J. Kirkby (physics), D. H. Nagel (chemistry), Gustav Mann (physiology), J. G. Kerr (zoology), Robert Howden (anatomy), James Ritchie (pathology), D'Arcy Power (surgery), W. W. Fisher (preventive medicine and public health).

Decrees have been passed to authorise the expenditure of 475*l.* on extending the system of electric lighting in the university museum, to raise the total emoluments of the Wykeham professor of physics to 800*l.* a year, and to raise the salary of his demonstrator in advanced work by 100*l.* a year, so that he may take charge of the laboratory both in vacation and term time on occasions of the absence of the professor.

The honorary degree of D.Sc. has been conferred on Prof. Ray Lankester, who delivered the Romanes lecture on June 14, and the degree of D.M. on Prof. William Osler.

Only one man of science—Prof. G. H. Darwin—is included in the list of honorary degrees for the Encænica this year.

PROF. A. S. MACKENZIE, professor of physics in Bryn Mawr College, has been appointed to the chair of physics in Dalhousie College.

THE Senate of the University of Birmingham has decided to invite Sir Archibald Geikie, F.R.S., to deliver the Huxley lecture in 1906.

We learn from *Science* that it is announced that Harvard University has received an anonymous gift of 20,000*l.* for a museum of social ethics, and 10,000*l.* from Mr. Jacob H. Schiff, of New York, for explorations in Palestine.

An exhibition of practical work executed by students of technical classes and by candidates at the recent annual examinations of the City and Guilds of London Institute will be opened at the Imperial Institute on Wednesday, June 28, by the Right Hon. Earl Spencer.

THE announcement is made in *Engineering* that Mr. Yarrow has placed at the disposal of the council of the Institution of Civil Engineers the sum of 10,000*l.* to be applied to the education of necessitous members of the engineering profession. It is pointed out that the engineering industry of the country will benefit from this help to technical education. The old system of premium apprenticeship is passing away, and it is coming to be recognised that the prosperity of any manufacturing nation rests on engineering, and that a foundation for the commercial success of a country cannot be maintained without the aid of a body of scientific engineers. The era of happy-thought invention is fast passing, and the opportunity for original work must chiefly depend on the application of science to perfecting known principles. Gratitude should, therefore, be felt for the public spirit which has placed in the hands of the Institution of Civil Engineers the means of giving a better training to a class that has had few opportunities in the past.

THE foundation-stone of the new buildings of University College, Reading, was laid on June 6 by Lord Goschen, Chancellor of the University of Oxford. The freehold of the new buildings is a gift to the college by Mr. Alfred Palmer. The erection of the college hall and the buildings for the practical study of various branches of pure and applied science will be undertaken immediately, but substantial additions must be made to the building fund before the scheme as a whole can be carried out. At the luncheon following the ceremony, Mr. W. M. Childs, the principal of the college, said the day would be memorable in the annals of the college because of a splendid benefaction. Throughout its history the college had been exposed to peril by the absence of endowment. He then announced that Mr. George William Palmer had informed the president of the college of his intention to offer a sum of 50,000*l.* as a permanent endowment fund, to be called "The George Palmer Endowment Fund." In a letter to the president announcing his intention, Mr. Palmer said:—"My intention is to provide that the capital fund of the endowment shall not be applied to the erection of buildings, but shall be permanently invested, and that the income shall be applied to the educational work of the college. I also desire to make it a condition of my gift that the college shall maintain its *status* as a university college in the town of Reading, and that it shall always give higher teaching in literature and in science, and, further, that it shall carry on evening classes, open at moderate fees to those engaged in earning their living during the day-time." Lord Goschen, in the course of a few remarks, referred to the direct missionary work which had been conducted by the old universities through the university extension lecturers. They were, he said, the missionaries of culture throughout a great part of our islands, and they had carried the flag of culture into many a town. A great variety of subjects is now taught in the college, but all that is taught, said Lord Goschen, is taught in a thorough, academic, and scientific manner. It is for the professors to see that the cause of culture, the cause of scientific study, shall not be neglected in these days. "Amid the hustling of those who champion various causes," continued Lord Goschen, "may I at least put in a word for higher culture? May I echo what Mr. George William Palmer has written, that literature and science may hold their own in this country apart from useful knowledge?" The president of the college announced that 80,000*l.* is required for the building fund, and of that sum 35,700*l.* has been subscribed.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 11.—"On the Resemblances existing between the 'Plimmer's Bodies' of Malignant Growths, and Certain Normal Constituents of Reproductive Cells of Animals." By Prof. J. Bretland Farmer, F.R.S., J. E. S. Moore, and C. E. Walker.

The authors, continuing their investigations on malignant growths, have examined the so-called "Plimmer's Bodies" of cancer cells in connection with the cytological changes that occur in cancer and in reproductive cells respectively.

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The "Plimmer's Bodies" are found in many cancerous growths, and are most commonly encountered in the younger or growing regions of the tumour. They appear in the form of vesicles, and they consist essentially of a fairly well defined wall containing a clear space in which is suspended a small darkly staining granule (Figs. 1 and 2). They are most commonly to be met with in

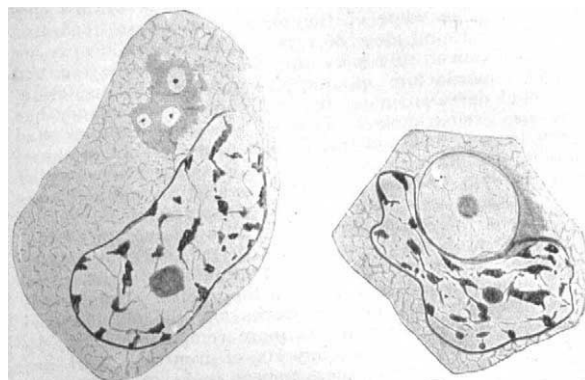


FIG. 1.

FIG. 2.

FIGS. 1 and 2.—Examples of "Plimmer's Bodies" from carcinoma. 1. Three small "Bodies" in an archoplasm. 2. Later stage in the development of the "Bodies."

tumours of a glandular or glandular-epithelial origin. They lie in the cytoplasm of the cancer cell, and usually in close proximity to the nucleus. In size, they vary from excessive minuteness to that of the nucleus itself.

The special interest attaching to them depends on the fact that they have commonly been regarded as peculiar to cancerous cells, although Honda believes he has occasionally also encountered them in inflammatory tissues. They have been variously interpreted. Some investigators have regarded them as parasitic organisms, more or less intimately connected with the etiology of the disease, whilst others have seen in them a differentiation of the cytoplasm of the cancerous cell itself. It has been suggested also that they might be derived from the centrosomes within the archoplasm, but the observations of Benda that centrosomes coexisted independently of them in the cell have rightly been held to disprove this hypothesis.

The authors' investigations indicate, however, that there are good grounds for re-considering the whole position, and a comparison of the processes that normally obtain during the final stages of development of the reproductive elements in man and the other mammalia appears strongly to suggest that a parallel between the "Plimmer Bodies" of cancer and certain vesicular structures occurring regularly in the gametogenic, but not in the ordinary somatic, cells, may be found to hold good.

It was shown in 1895 that during the prophase of the heterotype (first meiotic) mitosis of the spermatogenic cells, the archoplasm undergoes a highly characteristic and peculiar metamorphosis. In normal somatic, or pre-meiotic, cells, the archoplasm is seen to lie beside the nucleus as a dusky mass of protoplasm in which are con-

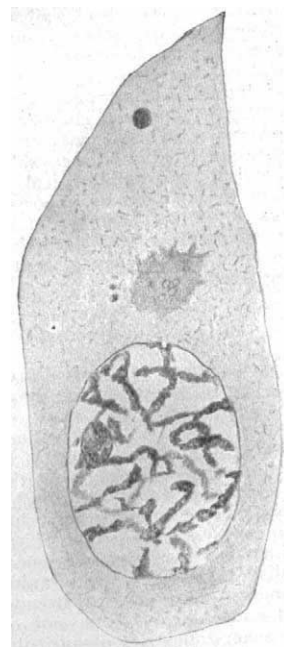


FIG. 3.—Archoplasm with centrosomes lying outside it in prophase of the first meiotic division in testis of mouse.